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The Forester

Vol. VI No. 10

TABLE OF CONTENTS

FRONTISPIECE

ADIRONDACK FORESTRY PROBLEMS ..... B. E. FERNOW 229
Director N. Y. S. College of Forestry

A GLIMPSE OF FORESTRY IN THE HIMALAYAS ..... F. E. OLMSTED 234

RAILROAD PLANTATIONS AND CATALPA 237
A Letter from Mr. JOHN P. BROWN

FOREST LAW IN THE UNITED STATES. 10–12 238
TREADWELL CLEVELAND, JR.

THE NATURAL SPREADING TIMBER AREAS ... . CHARLES E. BESSEY 240
University of Nebraska

EDITORIAL:
Fire in the Sierra Madre. The Schools of Forestry. Hope for New Hampshire. Prosecutions for Starting Fire 244

NEWS, NOTES AND COMMENT:
Forest Fires and the Recent Hurricane. The "Grand Prix" won by Canada. Facts About the Big Tree. Lumbering the Big Trees. Gypsy Moth Colonies. Forest Reserves as Game Preserves. Building Better Than They Knew. Michigan and Her Forests. Comment of a Lumber Review. Growing Timber for Special Purposes. Towns Without a Tree.... 246

REVIEW OF AMERICAN AND FOREIGN PERIODICAL LITERATURE 251

RECENT PUBLICATIONS 254

THE PLATFORM OF THE FORESTER

In order that the good will of its readers may become as effective as possible in aiding to solve our present forestry problems, the FORESTER indicates five directions in which an effective advance is chiefly needed.

1. The forest work of the United States Government which is now being carried on by the Department of Agriculture, the General Land Office, and the Geological Survey conjointly, should be completely and formally unified. The division of authority between the three offices involves great waste, and consolidation is directly and emphatically pointed to by the present voluntary co-operation between them.

2. A system of forest management under the administration of trained foresters should be introduced into the national and state forest reserves and parks.

3. Laws for the protection of the forests against fire and trespass should be adapted to the needs of each region and supported by the provisions and appropriations necessary for their rigorous enforcement.

4. Taxation of forest lands should be regulated so that it will encourage not forest destruction but conservative forest management.

5. The attention of owners of woodlands should be directed to forestry and to the possibilities of applying better methods of forest management.

Persons asking themselves how they can best serve the cause of forestry will here find lines of work suggested, along which every effort will tell. No opportunity for doing good along these lines should be neglected.

CHARACTERISTIC SOUTH SLOPE OPEN TO GRAZING. REPRODUCTION IN GROUPS.

(See "Forestry in The Himalayas," p. 234.)

THE FORESTER.

VOL. VI. OCTOBER, 1900. NO. 10.

ADIRONDACK FORESTRY PROBLEMS.*

BY B. E. FERNOW,

Director of the New York State College of Forestry.

The main and fundamental question connected with the Adirondack Mountain forest, the problem of ownership, has been practically settled by various acts of the Legislature, namely, in 1885, when the State determined to retain the lands which it then owned and to administer them through a Forest Commission; in 1890, when the first act authorizing the purchase of additional lands was signed by a Democratic governor, with the memorandum affixed that the act was good but inadequate; and finally, in 1897, when the Legislature and a Republican governor constituted the Forest Preserve Board and determined to acquire for the State by purchase or otherwise control of the entire region within an outline comprising three million acres, more or less, or as much thereof as might appear desirable.

Thus the State of New York recognized as a duty of the State and a fixed and firmly established State policy the protection of its most important watershed and of the forest cover thereon; it recognized that in State ownership lay the only practicable assurance of its conservation.

The acquisition of lands has proceeded cautiously and slowly. Unfortunately the State did not embrace the opportunity of acquiring these lands at a low price when it existed, and delay has had three undesirable consequences: first, to raise prices; second, to allow a further decrease of virgin forests and their deterioration by wasteful logging, and third, to allow private individuals and clubs to buy up large tracts for game preserves. While, at first sight, the passing of lands into conservative private ownership does not appear objectionable, inasmuch as a conservative treatment of the forest cover may as a rule be expected from such owners, there is no absolute assurance of the continuance of such conservative treatment. Besides, not only would public ownership of the whole give more satisfaction to the people at large, but in administering it the State would be benefited by a consolidation of its property. Even now the State would not make a mistake, financially or otherwise, if it were to settle the ownership question at once, and acquire without further delay the balance of what it intends finally to own.

The second problem is that of the administration of the property. At first a forest commission of three unpaid commissioners was charged with the "care, custody, control and superintendence of the forest preserve," and the law declared that "it shall be the duty of the commission to maintain and protect the forests now on the forest preserve, and to promote as far as practicable the further growth of forests thereon"; also, that the commission should "have charge of the public interests of the State with regard to forests and tree planting, and especially with reference to forest fires in every part of the State."

*Read at the meeting of the American Forestry Association in New York, June 25th.

In 1893 the number of the commissioners was increased to five, with additional powers as to acquisition and lease of lands, and especially the specific power, with certain restrictions, "to sell the standing spruce, tamarack and poplar timber, the fallen timber, and the timber injured by blight or fire." Another change was made in 1895, when an amalgamation of fisheries and game interests with the forestry interests was provided and the (five) Commissioners of Fisheries, Game and Forests were installed. The realization that the forest interests are decidedly more important than the other two interests has, during the last legislative session, led to the change of name by which "forests" are first mentioned in the title of the commission.

During the last session of the legislature a change in the administrative machine was also attempted; namely to change the five-headed commission to a single-headed one. Theoretically, such a single-headed administration may be commendable, provided a man of unusual administrative ability, broad-mindedness and experience is put in the place. With our Democratic principles of government, however, it would appear that wherever public policy, not single will, is to be administered, a judicious council representing varied interests would be more apt to give satisfaction, provided that it relies for executive work on expert advice and assistance and on single responsibility of its executive officers. In the end, the question of the personnel of the commission rather than the number is the important one, and still more important, the organization under the commission and the objects to be attained through that organization.

The first object, naturally, must be *protection* of the *property*, and that means, with forest property, mainly against the dangers from fire. This is the first and foremost administrative problem. The only way to furnish that protection is by proper organization of the fire service and by reducing the causes of forest fires.

It is not sufficient to have a system of fire-wardens, as the law now provides, but the system must be kept in working order and the means for putting out fires that could not be prevented must be ready at hand. Again, the personnel of the organization is of the first moment; and even when proper persons have been chosen as fire-wardens, a constant inspection and oversight only will keep them on the alert. It must also be kept in mind that there are mechanical limitations to performing the duties of a fire-warden over too large a territory; hence the appointment of a sufficient number of deputies, properly instructed and properly located during the dangerous season, is necessary. Nor is it sufficient to have these fire-wardens employed only to put out fires. In most cases, a forest fire, when it has once gained headway, will run its course, all human efforts notwithstanding, until a rain or swamp or watercourse stops its spread. The fire-warden is usually too late. During the dangerous season patrols must be on the alert to prevent the starting of fires or to extinguish small fires in their incipiency. The cost of such service will be argued against it and this objection is valid until we have a fully organized forestry service, in which the fire-guards perform other necessary duties and useful work besides the patroling.

There is one serious drawback in existing arrangements, which could be readily improved. It is the manner of paying for the service of fire fighting. At present, when bills are audited and paid by the town, the tedious delay of such payment is discouraging to the men who have to wait for the hard-earned wages for many months. Authority to make the necessary outlay on the part of the commission, for which the board may seek reimbursement through the town, is the ready remedy.

While these administrative problems are readily understood and their solution is not difficult, the problems of technical management of the property are more difficult to solve. What is to be done with the forest owned and protected by the State? What policy is to be followed in its treatment and what methods are to be applied?

The first legislation, instituting the Forest Commission, had in view the application of forestry to the management of the property, but the commission failed to devise such technical management and the people, as is well known, restricted the activities of the commission, by constitutional amendment, forbidding the cutting of trees on State lands.

Knowing the history of this amendment, we can assert that it was intended not to establish a policy of non-use and to exclude forever the proper use of the axe, but rather to delay it until conditions should be more favorable for the employment of technical forest management. If nothing else were to warrant this conclusion, the establishment of the New York State College of Forestry with its experimental forest area, within the limits of the proposed State Forest Preserve must stand as an earnest that, ultimately, technical forest management is expected and intended. There is, to be sure, no haste necessary to engage in such technical work, but even now the commission is in a position to do considerable preliminary work and to prepare for the future.

There can be no question as to the first step in attacking the problem of technical management. As the physician bases his treatment on a diagnosis, so the administrator of a property must first become acquainted with its conditions.

The first step, therefore, towards a technical management of the State's forest property must be a forest survey; *i. e.*, a technical description of the conditions of each parcel in such a manner that its character, condition and location can be readily referred to.

The commission should know not only the acreage of the burnt lands and of the virgin and the culled forest it controls; not only the location of each parcel of forest land, but the condition of each with regard to its possible treatment. Such a description can be satisfactorily made only by an educated forester who, like a physician, diagnoses with a view to devising the remedy. It is only when the condition of the whole or major part of the property is known that a harmonious, well-considered plan for its technical management can be devised and followed. It is then that the silvicultural problems involved become apparent.

It was mainly for the solutions of silvicultural problems that the New York State College of Forestry was endowed with an area of thirty thousand acres in the Adirondacks, the tract having been so located as to exhibit the greatest variety of problems that might be met in the entire reserve.

The silvicultural problems can be classified into at least four groups, with any number of subdivisions according to the character of the prevailing forest conditions. They will have to do with the treatment (1) of virgin lands, (2) of culled lands, (3) of slashes or burns, and (4) of swamps.

Since the virgin lands in the Adirondacks are reduced to a comparatively small area, a few hundred thousand acres, they may, like the swamps, be left without detriment to future consideration. It is, therefore, to the culled lands and the slashes, of which the major part of the State property consists, that attention should first be directed.

The slashes and old burns and openings of various kinds exhibit quite a variety of conditions and admit, therefore, the possibility of a variety of treatment. But they are all alike in this, that in their present condition they are in the greatest danger from forest fires and that, in most cases, they fail to grow useful material. They are not only dead capital, but a menace to the standing timber. Not only do they furnish the best chances for the starting of fires, but once a fire is started, the winds, sweeping through the open, drive it with such fury that human efforts to stop its progress are in vain. Usually it burns over the entire opening and destroys whatever young growth nature has begun to cover the ground with.

In some places, repeated fires have almost cleared the area of the old débris and it is possible to begin planting with valuable species without further preparation. In other cases, there is need of clearing the ground of débris more or less thoroughly in order to reduce the danger

of fire and make the planting practicable. The degree to which the clearing is necessary varies, and so does the cost.

The college has started the solution of the question of how much clearing is needful and how cheaply this preparatory work may be done, as well as how cheaply a growth of valuable species may be reestablished. Sometimes nature has covered the burn with a growth of Aspen or Birch, and if left alone, the most valuable conifers, Pine, Spruce, and Cedar would gradually establish themselves by natural process. But even here the helping hand of man may hasten the process of useful occupancy of the soil by using as much of the volunteer crop for nurse purposes as may be desirable. Lanes are opened through the Aspen growth at varying distances apart and Pines and Spruces set out in the lanes, where they will be benefited by the light shade of the Aspen and White Birch.

One of the essential requirements in this reclamation of waste lands is adequate protection against fire. As I have pointed out, the greatest danger lies in these very areas; hence special precautions to reduce it become necessary wherever the expenditure for planting has been made. Greater vigilance and special fireguards are required, and in addition mechanical means can be employed to reduce the danger. Among these one would be to take the entire burn in hand at one time, as far as possible, clearing and burning the débris, so that the cleared and planted area be bounded by standing timber or by water or marshy land. The area could then be subdivided by ditches, or better still by lanes sown to grass, which can be kept in proper condition and made to serve as bases of defense in case of fire. Old snags, especially dead Pines, must be downed, as they are apt to be set on fire by lightning.

The question, I suppose, is asked, does it pay to reforest these wastes? The answer is that if the State really proposes to hold, protect and improve this forest area as a whole, it does pay unquestionably, even were we to look at it only as a work of internal improvement. And, if, as the indications are, the cost of restocking these at present worse than worthless tracts be kept below $10.00 per acre on the average, it can be figured out as a profitable financial proposition even.

This work of reclaiming wastes is, by the way, one against which no conditional bar exists and which, therefore, could be taken in hand at once by the Forest Commission.

The other problem, that of handling the culled lands, is one presenting much greater difficulties. While the reclaiming of the waste lands is merely one of expenditures which can be more or less accurately determined, the rational treatment of the forested lands requires not only much more skill, but their improvement, if it is to be kept within practically advisable expenditures, is dependent on market conditions over which the State may not exercise control. To understand the problem, we must state the conditions.

The Adirondack forest is one composed of a variety of species in which the hardwoods, Birch, Maple and Beech, preponderate, and the conifers, Pine, Spruce and Hemlock, form a more or less prominent part. The culling has been of the latter, so-called softwoods, especially Pine and Spruce, because they were most in demand and most easily handled and transported by water. As a consequence, after the culling process, the hardwoods, preponderating before, have become still stronger: and only the Spruce's ability to tolerate shade has maintained, besides the decrepit old trees which the logger left, the growth of young ones. The White Pine, which cannot reproduce itself under the shade of the hardwoods, is almost extirpated except on occasional openings. The hardwoods, while furnishing a full and pleasing canopy of foliage which may mislead the uninstructed into the belief that he is looking upon virgin woods, exhibit in the old specimens the decrepitude of age, dead branches and rotten heart; and many of the younger, thrifty looking trees, upon closer investigation, also show the signs of decay as a result of the running fires which have swept over nearly every tract of the wild woods.

This, then, is the condition; a forest of old, decrepit hard-woods, deteriorating from year to year, with a tainted progeny struggling beneath, and a small, though promising number of young Spruces impeded in their development by the former, with occasional older trees that can be used as seed trees. Can there be any question as to the changes which it is desirable to effect, if we apply the reasoning of rational political and financial economy? Remove the dead capital of old hard-wood timber and replace it by a young, thrifty crop growing into value, in which the more desirable conifers preponderate!

The silviculturist will have to decide as to how best to secure this young crop, which may be done by favoring the volunteer crop of conifers, by giving a chance for seeds from left-over seed trees to find a seedbed and favorable light conditions for development, or by planting or sowing artificially. But before he can apply his skill, the manager must have found a way of disposing of the hard-wood crop. And here is the pivotal point of the problem, as with most of the forest problems that are to be worked out on a financial basis in the United States, namely the market question.

If the silviculturist is to show his skill in producing a new crop, the old crop must be disposed of; not only must a market first be found for the sound, merchantable sawlogs, but for the much more bulky and less valuable portion of poor cordwood, which, in the Adirondack timber, may readily be set down as exceeding in quantity the saw material six to seven times. Where this cannot be done, the culled lands may still eke out an income by further culling the forest of Spruce and other pulp material, etc., but it is evident that this can only be at the expense and to the detriment of the value of the property. In such cases, there is nothing left to do but to wait for economic conditions to change until the old hard-wood crop is saleable—the time for the application of silviculture has not arrived.

One of the absolutely unavoidable conditions for marketing hard-wood material is accessibility to railroad transportation either for the raw material or the manufacture. Therefore, before the State can enter upon a policy which has in view the rational use of its property from a forestry point of view, it must change the provision which prevents railroad building over State lands. I do not advocate the indiscriminate opening of the State lands to railroad construction, but merely state that rail transportation is a necessity for technical management of these lands.

The State College of Forestry has been successful in securing a market for the hard-wood material on its tract of thirty thousand acres, by inducing manufacturers of staves and of wood alcohol to combine in establishing plants and in building the necessary railroad tracks. By such combination, the fullest and most economical use of hard-wood materials at present known is secured, since all sound material to a diameter of eight inches and a length of thirty-two inches can be used for stave-wood, while the retort and fuel wood used in the manufacture of alcohol takes the material down to three inches, thus assuring the fullest possible utilization of all the material in the tree. Of course no restrictions as to largest or smallest diameter of trees to be cut or to be left have been allowed in the contract, silvicultural considerations alone coming into the question as to what is to be cut and what to be left. The college is the sole arbiter. The amount annually to be cut is necessarily determined by the requirements of the manufacturer.

To the European forester, and to those who attempt to propagate European systems of forest management, based on doubtful calculations of capital stock and yield, the absence of such calculations and of an adherence to a so-called sustained yield management will appear strange.

In the first place, the data upon which such calculations are based can hardly be secured with any measurable degree of accuracy from the virgin woods, nay, it is well nigh impossible to ascertain the rate of growth which will prevail after the silviculturist has changed the light conditions under which growth proceeds. In the second place, the time for these finer methods has certainly not arrived in our

country, where we have to deal with delapidated virgin woods in which a sound financial policy can only be to replace them as soon as possible by a crop which will utilize the soil to its fullest capacity. No fine measuring, calculating and predicting of future incomes is necessary to assure us that the replacement of a decrepit, old stand of timber by a vigorous new crop of better kinds is the true financial policy for the State. Let the next generation count the chickens for which we have secured the opportunity of development, favoring the better breeds.

And so for the rest of the State lands the same policy should be pursued, namely, as slowly or as fast as market conditions and other æsthetic as well as economic considerations warrant, to change the old, unprofitable investment of nature into a new, live investment of art and skill, by practicing silviculture pure and simple.

A GLIMPSE OF FORESTRY IN THE HIMALAYAS.*

By F. E. Olmsted.

If one can picture to himself a country something like the mountains of North Carolina, but with a forest growth more like that of the Adirondacks, and then place a glorious range of giant snow-peaks in the background, one can form a very good idea of the Himalayan foothills; at least of that part known as the "Jaun Sar" Division of the Dehva Dun Conservancy, to which this very brief and rough account refers.

Strip the southern slopes of all tree growth, and the picture is still better; when the monsoon breaks in June of each year, the snows are quickly melted away, and the soil is left at once to the mercies of an Indian sun, which has remarkable powers of drying what little earth the snows and floods have left. The northerly slopes, however, are fairly well covered with conifers and broad-leaf species, both in pure and mixed woods, the trees running up to ten and twelve thousand feet in altitude.

Above and beyond the tree line lie the grand old snows, those snows from which the sacred rivers, Ganges, Jumus and Indus spring, in whose waters countless numbers of good Brahmins wash their sins away each day, and down whose streams a very business-like Forest Department floats its logs.

Here the summer climate is most delightful, and the winter not at all severe. In fact on the coldest days the sun has a way of being very tricky, and if you step out of the bungalow without a hat you will certainly pay for your carelessness in a very painful way.

The forest organization is a most admirable one, the higher officers being men trained in the schools of Germany and France, while the subordinate positions are occupied by natives who have graduated or studied at the Royal Forest School in Dehva Dun. It must be said, however, that the majority of "natives" do not take to life in the jungle, but prefer positions in the towns and large cities; so that at times it is difficult to obtain good men.

Some Government forests are "reserved," that is, held without any hindering "rights" or privileges of any kind, while others are "protected," or subject to grazing rights and other ancient usages of the villagers.

As for the forests themselves, they consist principally of Deodar, Spruce, Fir and Pine, among the conifers, and various species of Oak, both mixed with the former and forming pine woods in certain localities. By far the most valuable of all the timber trees is the Deodar, which has a wood very much resembling our own Cedar, and which is used for many pur-

*Read before the meeting of the American Forestry Association in New York on June 26th.

poses, the chief use being that of railroad ties. On account of the remarkable powers of endurance which this wood possesses (due to the oil it contains), it is very valuable when a wood is required which must be placed in contact with the soil for a period of years.

Sylviculturally considered, the Deodar is an easy tree to regenerate naturally; but each different locality must be treated in a different manner to insure success. On moist northerly slopes the species grows flourishingly under most any condition of shade; but on the dry southerly slopes it almost invariably requires a nurse of some kind during youth. Blue Pine fills this position most admirably, although if not looked after it will gradually suppress the Deodar; but this danger is avoided by girdling the Pine over large areas, whenever it has served its purpose and threatens to kill out the more valuable species. It is an open question as to whether or not this girdling had been carried too far; in certain cases it certainly appears so; but if moderately applied it is without doubt a great help to the forest's future value. All over the sunny southern slopes, little groups of Deodar can be seen taking advantage of the shade of Spruce, Pine, Oak and even Rhododendron, although the mother Deodar may be a hundred yards away.

OLD DEODAR, SHOWING CHARACTERISTIC SHAPE WHEN BEATEN BY WIND.

The Oaks are found at almost all altitudes, running up to nine thousand feet, and they can be naturally regenerated if the ground is not covered with a pestiferous little plant called "Strobolanches," which with its very dense and compact root system entirely prevents the acorns from reaching the mineral soil. No oak is cut for timber, but the whole supply is used as firewood by the neighboring garrisons; this is carried down the mountain trail on little hill ponies, each one of which is so loaded down that you see nothing but a pile of wood moving through the forest.

In all localities where grazing rights prevail the forester is of course somewhat handicapped; this is especially true in forests kept simply for "protection," such as those on steep slopes, which are preserved to prevent the débris of the hillside from being washed down on the fields of the valleys. Of course if the seedlings are constantly destroyed by the cattle, the forest gradually thins out, and the rains rush down unimpeded over the hard trampled ground. In many places a very good system prevails of closing a certain area to grazing whenever regeneration is attempted; and as the natives are careful to obey the rules, the result is successful.

All along the foot of the hills one sees a vast amount of territory covered by so-called "raws," which are broad and very rocky stream beds, filled with water during the monsoons only; these eat their way, little by little each year, into the surrounding fields, and are gradually stealing away the farms.

In such an article as this, the subject of working plans is somewhat too deep to touch upon, and it will be enough to say that the forests are managed on the selection system, only the annual growth being cut each year. This is arranged according to diameter classes and areas, all trees down to a fixed diameter standing on a certain number of acres being felled annually. Consideration is always given to the sylvicultural demands, however, and where these clash with question of present financial returns, preference is given to the former.

Working plans are sanctioned for a period of twenty years, and new ones are constantly being made. In this particular part of the Himalayas, extensive blocks, sometimes covering a whole slope, are taken in hand and every marketable tree down to a certain diameter is calipered; the area is determined from the excellent maps available and the necessary calculations follow. A splendid system of well-made trails covers the mountains, and wood is also taken out very economically and in great quantities by log railways, steep cables, dry shoots, and flumes.

As in every other part of the world the great danger here to the forest crop is that of fire. Although the country is an exceedingly difficult one to handle, owing both to its configuration and the character and religious scruples of its inhabitants, such a system of fire protection has been gradually built up that losses have been greatly reduced in late years. An officer in charge of a range looks upon it as a disgrace to himself if fire gets the best of him, and the forest is splendidly provided with a network of fire lines. These are cleared and burned over each year (sometimes two or three times a year) and during the dangerous season, from February to May, additional men are put to work in the woods in order to be on hand in case of emergencies. Villagers can be summoned at any time by the forest officer in charge. A most valuable thing in case of an extensive fire is a sketch map, showing simply the formation of the country, giving all streams, ridges, fire lines, roads, trails, clearings, houses and in fact showing accurately all points of vantage from which a fire can be fought.

A forest officer's life in the Himalayas is certainly a most interesting one, and provided he is a hunter or botanist, a most enjoyable one. In this corner of the world he must be content to live a life of solitude, as he is often off for many weeks together and sees no single white face. But this does not infer that he is uncomfortable, for an army of servants is always by him, and he lives in comparative luxury the year through. Besides, the hills, the trees, the tigers and deer are very good companions, after all.

RAILROAD PLANTATIONS AND CATALPA.

A Letter from Mr. John P. Brown.

[As many of the Forester's readers already know, Mr. John P. Brown, the Secretary of the Indiana Forestry Association, has lately been traveling about the middle West with a special eye to plantations of Catalpa, and to the possibility of interesting railroads in tree-planting. In answer to an inquiry about his observations and the success of his trip, Mr. Brown wrote the Forester a letter from which the following is taken. Ed.]

Almost without exception I have been courteously received by the highest officials of railways; the methods proposed have been recognized as sound business propositions, and further detailed information asked for. But railway organizations are vast machines, and so important a step as planting trees on a large scale must be considered with care by many officials. Hence it will take time to accomplish this work.

The work of forest planting has hitherto been largely experimental, especially that undertaken by railway companies during the past quarter century. While it was well known a century ago that Catalpa wood was the most enduring of all American trees, yet it was not known where it would grow, and hence a variety of timber was planted, much of which entirely failed. These numerous experiments have shown that *Catalpa speciosa* is hardy in all territory east of 100° Lat. and south of 44° even to the Gulf of Mexico, and in New England. Also that it is a remarkably strong grower—exceeding in that respect almost every American tree. Thus it has become known as the ideal tree for commercial planting, whether by railways or by individual planters.

The plan of utilizing the right of way for an avenue of trees has been imperfectly tried by a few roads. Skilled men have not been put in charge and the plantations have been neglected. Yet they have by no means been without results. Some two decades ago one of the Pennsylvania lines in Ohio planted Red Cedar along the track, while the Catalpa was planted along an Indiana branch line. Cedar is so slow to mature that little has resulted from the Ohio plantation, except that, æsthetically, it does greatly relieve the monotony of railway scenery. In the case of the Catalpa trees a majority were unfortunately *C. bignonioides*, and worthless, yet a few good specimens of *Catalpa speciosa* did succeed in making substantial progress, even under such neglect, in a sod of blue grass, and with the principal branches mutilated by telegraph linemen. I measured some sixteen inches in diameter, seventeen years after planting. Along the Burlington, in Nebraska, many trees were planted on cuts to prevent the drifting of snow, and some of them have grown exceedingly well in a dry climate and without care.

I find that a serious mistake has been made where the theory of close planting has been followed. For instance in the 1,200 acres at Farlington, Kansas—4 x 4 feet and never thinned—the trees are stunted and no larger to-day than they were ten years ago. In fairly good soil it requires about 256 square feet of surface for the perfect development of root growth during the first quarter of a century. Thus with *Catalpa speciosa* my observations have shown that when planted sixteen feet apart both ways, the trees make one inch diameter growth per annum, while at a less distance apart the roots become so matted and interwoven in fifteen years as to prevent a satisfactory growth. The 4 x 4 method, giving only sixteen square feet of surface to each tree, has in every instance dwarfed the entire plantation *inside of six years*.

At Governor Furnell's place, Brownville, Nebraska, I dug up a cluster of Catalpa of four years' growth from the sod, where they stood four feet apart each way.

One tree was five inches in diameter and 24 feet high. The roots occupied a solid mass of 7 feet in diameter. One root extended 15 feet from the tree; two I traced 10 feet; and three others, 8 feet from the trunk. The surrounding trees were only 2 to 2½ inches in diameter, while the entire root system was confined to a space the size of a bushel basket.

In this case the one stronger tree had overcome all others, but this was an exception, since in the general plantation the trees were all very small; all starved at the early age of four years. I cannot put this too strongly when thousands are watching the results of these early plantings, to decide whether or not tree planting is profitable. The Yaggy plantation at Hutchinson, Kansas, 500 acres in Catalpa and 800 acres in Apple, the forest planted in 7-foot rows, 4 feet in the row, to be gradually thinned, is from the start a profitable investment. This winter, the eighth year, the trees will be thinned to 7 x 8 feet and later to a permanent stand 14 x 16 feet. Three thousand dollars' worth of posts were sold last winter, and ten thousand dollars' worth are now ready for the market from the thinnings.

Actual measurement of more than five thousand trees, in all parts of America, prove conclusively that forest planting is a profitable investment, if systematically managed, whether by individuals or corporations. One thing is an assured fact, native forests are not increasing one-tenth as fast as they are being denuded. It is full time that Government, States and corporations should be moving in the matter of a future supply of timber."

FOREST LAW IN THE UNITED STATES.*

By Treadwell Cleveland, Jr.

X. DISTINCT SUCCESSES.

It may be of some service to the general reader if we note particularly some of the more conspicuously successful efforts in forest legislation.

First in national importance among the successful measures comes the law on which the Federal Reserve policy rests. By the reservation of approximately forty-seven million acres of public forest lands the United States has pointed the way for an exemplary system of forest protection and management. Already there are laws enough on the statute books to provide for a full and efficient Federal Forest Service. The question is simply whether a true appreciation of the reserves on the one hand, and on the other of the laws by which they may be regulated, can be aroused and maintained in full effect among the people of the various districts of the country.

* For Mr. Cleveland's first, second and third articles on this subject, see the Forester from July to September.

Recent official intelligence confirms a statement made in the first paper of this series regarding the general sentiment toward the reserves. Everywhere a marked change of front is visible; the people may be said to be demanding the continuance and extension of the reserve policy.

Among the States, New York, Pennsylvania, Massachusetts, Minnesota and some others, in a less degree, have carried forest legislation to an excellent issue. This is not to say by any means that these or any other States have fully covered the ground in law, but merely that with their protective laws, and their administrative provisions, these States have taken steps which mark historic advance.

XI. DOUBTFUL ISSUES.

Yet a great deal still remains to be done in the way of exact local provisions as well as in efficient and conscientious forest administration. The lieu-land law which permits *bona fide* settlers within the pro-

claimed boundaries of reserves to relinquish their claims there and to take out claims as they choose in other forested public lands outside the reserves, has within the past year opened the way for fraudulent use of public timber. Suppose, for instance, as in the case noted in the first paper, that such *bona fide* (!) settlers are lumbermen's dummies, who have taken advantage of the letter of the law to receive pay for giving away to the lumbermen public forest property to which, in the spirit of the law, they were by no means entitled. Suppose the lumbermen to have cut from the claims of such dummies all available timber, so that the claims have become worthless for the axe. Then suppose the passage of the lieu-land law. Further supposition is unnecessary. Facts relate the rest. Some of the most valuable timber adjacent to the Olympic Reserve in western Washington has recently, under cover of this law, passed into the hands of lumbermen who have thus a second time robbed the government at its own invitation.

We have already seen when speaking of the Federal Reserves that the laws at present on the statute books which provide for the use of public timber, both reserved and unreserved, and for its protection from theft and fire, are individually inadequate and collectively inconsistent. It is true that the Commissioner of the Land Office drew up, and had presented to the last Congress, a bill aiming to repeal all these fragmentary enactments, and to substitute in their stead a single law drawn to meet the various local requirements. That bill, however, received no attention, and it is not altogether certain that its terms are at every point as good as might be wished.

XII. FOREST PARKS.

Beginning with the movement in favor of the creation of the Adirondack Park in the State of New York, there has been in late years a distinct development toward the preservation of forest lands for park purposes, a development which has been very markedly accelerated during the past few months by the promoters of the Appalachian and Minnesota Parks. The Appalachian Park when completely mapped out will preserve to the population within a reasonable distance from its boundaries, the free use and enjoyment of one of the most beautiful forested regions of our country—that rich hardwod stretch in the mountain regions about Asheville and through the western end of North Carolina. There is every reason to hope that the interests which are touched by this project may so far appreciate its importance as to carry it through successfully. The example of the Adirondack Park is before us, while New Hampshire and Massachusetts, through the excellence of their roadways and village improvements, are able under analagous conditions to attract to their wooded regions numerous summer visitors who bring to the community its chief life, and who take away increased health and energy to their work at home. Pennsylvania, in her forest lands reserved by purchase, is also making an effort to combine the interests of the forester with considerations of health and recreation. In Minnesota finally, against a strongly hostile pressure, an effort is being made, as is now well known, to preserve the forested lands lying about the headwaters of the Mississippi for the pleasure and benefit not only of the citizens of the State but of all citizens of whatever State, who care for nature and the conditions of the wilderness. Odd as it may seem, one of the strongest elements of hostility to this project appears on excellent authority to be the rum-shop element. For this district has no agricultural interests; the population consists largely of lumbering crews; while the lumberjacks with their wants, and those whose business it is to set a bait for their pay checks, give to the region its distinctive character. Of course these interests have a direct share in Congressional representation, to say nothing of state politics. This is perhaps sufficient to show that the interests of forestry when pushed with vigor have sometimes to cope not only with apathy and inertia, but also with forces which are actively and positively evil. It is believed, however, that such facts as these will not long bear the light of day,

and that good sense and the right conscience of the people will find a way to put public improvement and individual health before public spoilation and individual corruption.

XIII. CLOSING WORD.

Even the brief glimpse of forest law that has been possible within the limits of this series of papers will probably suffice to make clear to the reader the following points: (1) The forest movement has acquired an impetus that cannot be checked; (2) That movement has found effective expression in State and Federal laws; (3) These laws are laying the foundation for a perfected system of forest management; (4) Forest management has already reached practical success.

It will not do to close without noting the important effect of forest law upon the sentiment and practice of the people at large and especially upon private land owners. Where law opens the way the private possessor of forests is now ready to apply the lessons taught by public action to his individual benefit.

THE NATURAL SPREADING OF TIMBER AREAS.*

By Charles E. Bessey.

University of Nebraska.

SPREADING OF PINE FORESTS.

Since my last report on the natural spreading of timber areas, made last winter, I have had the opportunity of observing personally a number of cases. In a journey through northwestern Nebraska I observed with much interest that in many places the native Pines had spread out from the original timber areas. This was particularly noticeable where the Burlington railway had cut off the original sweep of prairie fires, thus permitting the seedlings to grow unmolested. In many places on Pine Ridge the little trees had pushed out from two to six or eight rods from the original line of the forest area. I am confident that within twenty years, if these spreading areas are protected, the timber line will have advanced from a fourth to half a mile.

In passing through the Pine region bordering on the Burlington railway west of the Black Hills in northwestern Wyoming I observed the same rapid spreading of the timber areas. Here there were in some cases veritable thickets of young Pine trees which extended the timber area for many rods beyond its original line. The general northwesterly direction of the railroad cuts at right angles what I take to have been the usual direction of the prairie fires from the southwest, so that it was on the northeasterly side of the railway that these spreading areas of Pines were to be seen. In a small number of cases I noted that the Pines were spreading (but I thought not so rapidly or vigorously) on the southwesterly side of the railway. It is probable that in these cases there were local conditions which prevented the prairie fires from sweeping over the areas as formerly.

SPREADING OF DECIDUOUS TREES.

In a paper prepared for the United States Division of Forestry, last winter, I spoke as follows of the spread of the eastern forests:

"The deciduous forests of the eastern portions of the State are now enlarging their areas wherever man is not actively engaged in destroying them. Left to themselves the forest areas of Elm, Ash, Oak, Hickory, Walnut, etc., are spreading at a rate so rapid that it has attracted the attention of many observers."

I may add to this statement that wher-

* But for slight modifications, the same paper as that read before the Nebraska State Horticultural Society in July.

ever I have traveled in the State since the presentation of my last paper, I have found additional proof of its truth. I have the utmost confidence that the timber areas are much larger where they have been protected than they were twenty or thirty years ago.

In this connection I may quote from a private letter written to me by Professor Blankinship, of the Montana State College of Agriculture and Mechanic Arts. In a conversation with him on this subject in June he spoke of having observed the same thing in southern Missouri.

"The line between forest and prairie runs from the southwestern corner of the State, northeastward to the Mississippi somewhat north of St. Louis. Greene County is on that line and it was there that I studied the subject, and the fact of forest extension is very evident. This county is about half prairie and these prairies are now confined to the higher uplands of that region, the timber apparently having followed up the water-courses and united in the broken ground at their heads, leaving the prairies as mere islands in the on-coming forest; westward the prairies are larger and we pass in about thirty miles from the unbroken forest to the plains with streams scantily forest clad. From the united evidence of the old settlers, I found that the timber had encroached on these prairie islands about one mile in the last fifty years, and that, too, despite the fact that it was being constantly cut for log houses and particularly for fencing purposes and fire-wood."

IS INCREASED RAINFALL THE CAUSE?

If we take up the question of the cause or causes concerned with this very evident increase in the timber areas we are face to face with a very difficult problem. It has been held by some observers that the principal cause is the increased rainfall upon the prairies and plains. In Nebraska, however, we have learned that the supposed increased rainfall is an error. It is true that fifteen or twenty years ago we had publications which seemed to be quite authoritative, in which the supposed increased rainfall was discussed; and there were maps drawn, even, to show how year after year the rain belt moved westward. As you are aware, Professor Swezey, of the University of Nebraska, has entirely overthrown this theory. His careful studies of the rainfall through long periods of time show that while there are short periods during which there is an increase in the rainfall, there are other periods in which there is a corresponding decrease. It is his opinion that there is no ground at the present time for the belief that the rainfall in Nebraska has increased during the period of its settlement. There can be no question that we must throw out of the discussion the theory that an increased rainfall has brought about this increase in the forest areas.

IS CHANGE OF TEMPERATURE A CAUSE?

It is sometimes said that other climatic changes than those directly connected with the rainfall have had to do with this increase in the timber areas. We hear the statement made that the climate is slowly changing, even where the increase in rainfall is not insisted upon. Now the climate of a country includes a number of factors. Moisture is one of the most important of these. Next to this perhaps may be placed temperature, and then wind, light, etc. With respect to these factors we have no indication whatever from a careful study of the meteorological data that there has been any permanent change in the temperature of the prairie and plains region. Our climate is neither growing hotter nor colder. Here again we find that we may have a series of years in which the temperature is increased, and then a series in which it is decreased, but no permanent change has been observed either in the way of an increase or decrease in the temperature.

IS LESSENED WIND A CAUSE?

With respect to the winds, this only can be said, that as the ground is more and more covered with tall-growing vegetation, such as tall shrubs and trees, we notice the movements of the air less and less. It is a fact that if we pass into the strata of air above the tree tops there is about as much wind in a wooded country as in

one where there are no trees. The difference is that we live upon the ground, and we judge of the amount of wind by what we feel ourselves. So it must be said that as there are more trees there will be less wind that we feel. I doubt very much whether there is any other connection than this between the forest areas and the wind. I doubt whether there is any possibility of showing that winds have decreased, and that as a consequence the trees have increased. It is rather the opposite—that as the trees have increased they have deflected the air currents upwards so that we feel them less and less.

EFFECT OF REMOVAL OF WILD ANIMALS.

Coming to matters which are of much more local importance, the inquiry may be made as to whether disappearance of the wild animals which formerly roamed over the plains and prairies has had any effect upon the timber areas. It is certain that the buffaloes, dear, elk and other herbivorous animals must have more or less affected the young timber areas, and yet when we compare the wild animals of this kind with the stock which man has brought in since, we are compelled to say that the former could have had very little effect upon the timber as compared with the latter. It is unlikely that the disappearance of wild animals has had sufficient effect upon the timber areas to be worthy of consideration.

EFFECT OF ADJACENT TILLAGE.

It has sometimes been said that probably the tillage of the adjoining fields has had a beneficial effect upon the timber areas. I think there is something to be said in favor of this suggestion. Here and there without question the tilled fields affect beneficially the surrounding untilled ground. This is especially the case where the tilled fields lie upon higher lands than the adjoining timber areas, and it will be noted that this is usually the case. The wash from the tilled ground will carry over upon the untilled areas rich materials along with the thin layer of actual soil, and so better conditions will be made for the springing up of young seedlings. I am inclined to give considerable weight to the suggestion that we have here one of the factors aiding in the increase of the timber areas, and yet in many places in the State I have seen the timber areas spreading miles and miles away from any possible influence from the tilled fields. It is only here and there that this can be admitted as a factor in the problem under consideration.

EFFECT OF STOPPAGE OF PRAIRIE FIRES.

When we look over the whole field we find that there is, however, one factor which is efficient; namely, that of prairie fires. Originally the plains and prairies were swept annually with fires which burned down to the ground every living thing. These fires, coming every year, made it impossible for the tiny seedlings to live. They had not yet gained sufficient strength in their roots to be able to send up shoots again and again from the uninjured underground portions. There can be no question as to the effect of prairie fires upon the seedling trees. Wherever the fires sweep over every seedling is destroyed. Since man has taken possession of the open lands he has restricted more and more the sweep of the fires, and here we have for the first time an efficient cause which enables us to understand how it is, and why it is, that the timber areas of the open country are spreading.

HOW THE PINES SPREAD.

When we make the inquiry as to exactly how timber areas are spread we find that there is some difference between the Pines and the deciduous trees. Thus in the case of the Pines, the seeds are scattered by the winds, being aided in this by the wings attached to the seeds. Apparently the seeds are scattered for considerable distances in the direction of the prevailing winds. Those which fall upon favorable spots spring up and become the little seedlings mentioned above. In the extension of the Pine forests the Pine trees alone seem to be concerned. There are no shrubs or weeds to form a cover in which the little plants start up. I have seen many places where the Pine seedlings were springing out of the sparse sod, sur-

rounded by the ordinary prairie grasses. I observe that where the sod had been cut, as in the removal of the soil for railroad building, the Pines spring up more abundantly, but I have seen very dense thickets of Pine seedlings where the sod had not been disturbed at all.

HOW DECIDUOUS TREES SPREAD.

In the case of the deciduous forests, where they are spreading we observe that there is always a fringe of weeds and shrubs, and that in this fringe the seedling trees appear. The weeds are the common wild weeds of the neighborhood. Thus in regions where sunflowers are abundant these will be found; also the taller growing goldenrods, asters, ragweeds, etc. Here we have a hint that weeds are not always harmful, as in these cases they certainly do serve to cover the ground in such a way that the more permanent vegetation is able to come in after them. Mingled with the weeds there are always shrubs. At first these are small and inconspicuous, but later they occupy the ground almost to the exclusion of the weeds. In a typical fringe around a forest area the weedy belt is farthest away from the timber, while nearest to the timber is a belt in which the shrubs predominate and where the weeds are of less importance. The shrubs to be found in these fringing belts are Wild Roses, Wild Plum, in some places Dogwood and Wolfberry (*Symphoricarpos*), Hawthorn, and on lowland, Elderberry, etc.

THE STRUGGLE FOR EXISTENCE.

In this fringe of weeds and shrubs the seedling trees start up. Of course a large percentage of these perish. Many of them are smothered by the too rampant growth of weeds and shrubs, but here and there a little tree persists, and finally overtops the other growth; and from this time forward the tree predominates. There is a fierce struggle for existence in these fringing belts about the advancing forests, and it is only because of the immense fecundity of the trees that their offspring are able to survive in the struggle. We rarely think of the large number of seeds produced by even an ordinary sized tree. I recently made a calculation as to the number of seeds produced by an Elm upon my place in the city of Lincoln. The tree is about thirty feet in height with spreading, well-balanced, and rounded top of about twenty-five feet in diameter. Every year this tree produces heavy crops of seeds, and my calculations show that a minimum estimate is one million seeds for the tree. I am confident that my estimate is too low rather than too high. Now let us stop for a moment and see what this implies. One million seeds, if scattered over an area in such a way as to have one seed for each square foot, would cover somewhat more than twenty-three acres of ground. If these seeds were all to grow, it would not be long before a great part of them would have to perish on account of their interference with one another. I am certain that my Elm tree produces so many seeds that, if they were properly planted and cared for, they would produce a forest of from ten to twelve thousand acres each season. Of course it is never possible for all the seeds to grow into large trees; and it would not be possible, even if the seeds were properly distributed at the first. What actually happens is this, the seeds are scattered within an area of probably not more than one-sixth of an acre, or say a circle of about fifty feet radius, with the tree in the center. A million seeds scattered over this small area would equal one to each square inch. Before the end of the first season these little seedlings so closely packed crowd one another so that many of them must die. I suppose that out of a million seeds not more than one-tenth of one per cent. succeeded in growing into young trees under natural conditions; and yet it is in this way, by the lavish use of the seeds which are produced by nature, that the forest areas are extended. These seeds fall upon the loose soil covered with leaf mould in the fringing belt of the weeds and shrubs about the timber, and here some of them spring up and eventually become trees. These when grown become centers for the distribution of more seeds and the formation of more seedlings; and so the growth goes on, and in this way the forests are extended.

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Fire in the Sierra Madre.

The last number of the FORESTER went to press with the statement regarding the Santa Anita fire that the wonder was, not that it "should have burned for a fortnight, but that it took no longer to bring it under control." A few hours later reports began to arrive in clippings from different California papers which showed that either this fire had by no means been extinguished during the first days of August, or that a new one had later broken out in the same region, and that under favoring circumstances and perhaps a not unnatural relaxation of vigilance, it had got under way with renewed vigor, and burned away once more over the mountain sides of the San Gabriel Reserve. It invaded one of the watersheds from which Los Angeles draws its water supply, and apparently threatened to keep on indefinitely before the steady wind. But after a week, heavy fogs on the 30th and 31st of the month did what rain could not have been expected to do till autumn—so reduced the size and speed of the fire that it was once more possible "to bring it under control." To quote one of the last reports which gave an account of the state of things in specific terms, there remained on August 31st only some smouldering logs, which were "being watched carefully by a large force of men." It will be noticed that this report did not say that the fire was entirely put out. To make certain of this only a great deal of unremitting drudgery, to which irregular labor could not easily be called in as in an emergency, would suffice. Could there be any stronger argument for mere numbers in the permanent force of forest rangers?

The Schools of Forestry.

In no way is the rapid progress which the country has been making toward a reasonable sense of the importance of its forests and of forestry during the last couple of years shown more clearly than in its greatly increased educational facilities. Indeed one might almost say that these have not so much developed, as sprung suddenly from nothing into vigorous existence. Until less than three years ago anyone who wished to make forestry his profession could receive only rudimentary and unsystematic instruction at home, and had to go to European schools for a good part of his education. Whatever the differences between European and American trees and economic conditions made it impossible for him to learn abroad he had still to learn well nigh entirely by himself. This autumn, however, no less than three well-equipped forest schools open for the winter term—at Biltmore, N. C., at New Haven and at Cornell; and at these institutions intruction is being given by the best and most experienced of America's foresters. In addition to this many State colleges and agricultural schools are devoting more or less time to the elementary principles of forest planting and conservation, and, further, the Government has, during the past year and a-half, been giving some eighty odd "student-assistants" training in the work of making surveys and field measurements. How great the value to America of this educational work really is becomes clear when one considers the difficulties which now confront whoever tries to solve any of the many forest problems with which the country is concerned. Of all our valuable trees there is hardly one of which

the silvicultural characteristics are known with any approach to nicety. Messrs. Graves' and Pinchot's studies of the White Pine and the Adirondack Spruce constitute almost all the literature of their kind. In regard to such valuable timber supplies as those to be found in the great Red Fir forests of Oregon and Washington, for example, no one can make more than the roughest guesses at the measures which should be taken in order that, where the cut-over lands are not devoted to agriculture, the growth of a good second forest crop may be insured. On every side it still remains to break the ground for the first time, and many laborers are needed. The American student of forestry must spend much of his time playing the pioneer in fields yet unexplored for some years to come, often letting the practice of his art wait for the results of investigation and experiment. His methods will be shaped by conditions which have to be studied on the spot. For this no European school alone can possibly give the right training. Although some experience abroad is valuable, the complexion of an American forester's education should just as certainly be distinctly American; and only with the help of good American schools of forestry can such an education be obtained at the best advantage.

Hope for New Hampshire.

According to a letter recently received from the office of the Massachusetts Forestry Association, there seems to be better hope that New Hampshire may at last rouse itself to the point of doing something really effective for the preservation of the White Mountain forests. In his speech at the celebration of Old Home Week in Concord, the Governor of the State lately stated things squarely, and declared himself clearly and emphatically in favor of a vigorous forest policy. Referring first to what other States have done to encourage the summer tourist business, Governor Rollins went on: "What have we done? Not one dollar for good roads; a very small sum annually, $8,000 for the fish and game, and no protection to our forests. Some one will say: 'We can't afford to spend money for these things.' I am tired of hearing that; you can't afford not to. But we are not poor; we don't owe anything to speak of. Why, there are many towns and cities in this country with 20,000 inhabitants which owe more money than we do. In 1905 we shall be practically out of debt at the present rate of payment. A large portion of the towns receive to-day from the State more than they pay in State tax. So I say that the State tax to-day is no burden, and could not be if it were three times as large. What would I do? I would spend $1,000,000 in good roads, distributed over a number of years. I would give the fish and game commission, $50,000 a year if necessary, rather than $8,000. I would make a park of the White Mountains, and of Lake Winnepesaukee, and protect them from ruin. In other words, liberal expenditure now is greatest economy for the future. This State sold thousands of acres of timber lands a few years ago for $25,000. What is it worth to-day? Hundreds of thousands. We are throwing away an opportunity not to be regained if we don't act soon. The purchase of this timber land for a park is a good investment, if nothing else."

The truth and soundness of this need no comment. The summer visitors, the hotel proprietors, the railroads, the large manufacturing corporations along the Merrimac River, which more than ever of late years have been troubled by freshets and drouth, the lumbermen themselves, if they realized it, are all interested in having the White Mountain forests cared for and preserved. Their perpetuation is a matter of which the importance to New Hampshire and the neighboring States, for practical reasons alone, can hardly be exaggerated. But it is also largely because of these forests that the White Mountain region is one of the most beautiful in the country. For years fire and wasteful lumbering have carried destruction into one district after another of this region, without check or hindrance. But now Governer Rollins, a man who is already recognized as unusually discerning and

practical in the promotion of the State's interests, has taken up the preservation of her forest resources, and sounded a call to action. It remains for the citizens of New Hampshire and their legislature to give the Governor all the support they can.

Prosecution for Starting Fire.

An excellent example of the common indifference to all fires except those which burn buildings, and of the difficulty of carrying legislation about them into effect, is given by Gen. C. C. Andrews in his latest "Annual Report of the Fire Warden of Minnesota." The case was that of a man in Chicago County, who, in the early part of January, when the ground was bare and the weather dry and very windy, set a fire to burn his brush. The fire spread "and destroyed nearly two thousand dollars' worth of hay and other property belonging to his neighbors." The man's farm, buildings, stock, etc., were exempt from execution, so that none of the property could be taken in payment for the damage. The chairman of the town board would not make the complaint, and so the chief fire-warden had to go and make it himself. The man "pled guilty to carelessly causing the fire, was fined only $15, together with $3.05 costs, and yet the community did not sympathize with the prosecution."

This shows once more the importance of having fire-wardens who cannot be tempted to neglect their duty by the popular sentiment in their districts. It also shows how very important it is that prosecutions should be carried on, though they be as disagreeable as the punishment of a child. For though the prosecution of any one individual may, strictly by itself, be of little moment, it is the only denial of the assertion that a man must not be blamed for setting a fire "carelessly," which in any way tells. The more the people of a region growl at the enforcement of the fire law the greater is their need of it. Where they realize generally that the man who causes needless destruction by fire is practically robbing his neighbors and the community, more than half the difficulty is overcome. In such places the fire-warden is forestalled in the heaviest part of his work. Fires become exceptional misfortunes. But in other places where they are regarded as belonging to the natural course of events (and such places are grievously many), they occur with the greatest regularity, and further always will, until either an uncomfortable scarcity of wood or the pressure of some force from outside, like an efficient fire-warden, teaches them to see forest fires aright. As quicker and more economical than the diminishing wood supply, an efficient fire-warden is to be preferred.

NEWS, NOTES, AND COMMENT.

Forest Fires and the Recent Hurricane.

In summing up the damage done by the recent hurricane, which entered New England on Wednesday morning, September 12th, the *Springfield Republican* says: "It started into life scores of wood fires, and Wednesday night in many sections of New England thousands [?] of acres were ablaze, and several scores of houses had been burned." It is needless to say that the fires thus started into life were not set by the hurricane, or to any great extent, while the wind was blowing. They were already burning, partly or wholly disregarded, and before the wind fanned them into activity they were probably thought to be insignificant. The labor that would have been required to put them out before the arrival of the wind storm would have been proportionately insignificant.

The "Grand Prix" Won by Canada.

Canada has won the highest award given the forestry exhibits at the Paris Exposition this year. In a letter to one of the

Canadian papers Mr. A. K. Stuart says that the principal reason why the Grand Prix was awarded to Canada was that its exhibit exceeded all others in the commercial excellence and the extreme variety of the woods which it displayed. The Russian exhibit was much larger, and many other countries spent much more money on their exhibits than did Canada. Mr. Stuart thinks that if Canada had made as great an effort as these other countries its exhibit might easily have eclipsed theirs in almost every respect. As it was, however, he says that it made a great impression, and that if Canadian lumbermen and manufacturers will follow up the opportunities which will undoubtedly come from it they will gain greatly by the exhibition.

Facts About the Big Tree.

The Report on the Big Trees, recently prepared by the Division of Forestry, contains as preface the following "summary of facts":

1. The dimensions of the Big Tree are unequaled.

2. The age of the Big Tree makes it the oldest living thing.

3. The majestic beauty of the Big Tree is unique and world-renowned.

4. It now exists only in ten isolated groves on the west slope of the Sierra Nevada Mountains, and nowhere else in the world.

5. The Mariposa Grove is to-day the only one of consequence which is completely protected.

6. Most of the scattered groves of Big Trees are privately owned, and therefore in danger of destruction.

7. Lumbering is rapidly sweeping them off; forty mills and logging companies are now at work wholly or in part upon Big-tree timber.

8. The southern groves show some reproduction, through which there is hope of perpetuating these groves; in the northern groves the species hardly holds its own.

9. The species represents a surviving prehistoric genus of trees once growing widely over the globe.

Lumbering the Big Trees.

"The lumbering of the Big Tree is destructive to a most unusual degree. In the first place the enormous size and weight of the trees necessarily entails very considerable breakage when one of them falls. Such a tree strikes the ground with a force of many hundreds or even thousands of tons, so that even slight inequalities are sufficient to smash the brittle trunk at its upper extremity into almost useless fragments. The loss from this cause is great, but it is only one of the sources of waste. The great diameter of the logs and, in spite of the lightness of the wood, their enormous weight make it impossible to handle many of them without breaking them up. For this purpose gunpowder is the most available means. The fragments of logs blown apart in this way are not only often of wasteful shapes, but unless very nice judgment is exercised in preparing the blast, a great deal of the wood itself is scattered in useless splinters.

"At the mill, where waste is the rule in the manufacture of lumber in the United States, the Big Tree makes no exception. This waste, added as it is to the other sources of loss already mentioned, makes a total probably often considerably in excess of half the total volume of the standing tree; and this is only one side of the matter.

"The Big Tree stands as a rule in a mixed forest composed of many species. The result of Sequoia lumbering upon this forest is best shown by the photographs. The destruction caused by the fall of the enormous trees is in itself great, but the principal source of damage is the immense amount of débris left on the ground—the certain source of future fires. This mass of broken branches, trunks and bark, is often five or six or even more feet in thickness, and necessarily gives rise to fires of great destructive power, even though the Big Tree wood is not specially inflammable. The devastation which follows such lumbering is as complete and deplorable as the untouched forest is unparalleled, beautiful, and worthy of preservation. As a rule it has not even had the advantage of being profitable. Very

much of this appalling destruction has been done without leaving the owners of the Big Trees as well off as they were before it began."—*Report on the Big Trees*, Government Printing Office.

Gypsy Moth Colonies.

"Secretary Stockwell, of the Massachusetts Board of Agriculture, has recently made a survey of the districts infested by the gypsy moth to ascertain the effects of a cessation of the moth-killing. The legislation refused to make an appropriation this year for continuing warfare on the moths, but near the close of the session put in an item of $1,000 for observation of the insects and care of the State's apparatus.

"The secretary tells a Boston paper what he found in Malden, Medford and Middlesex Falls. The most interesting discovery was an evergreen hedge, on a neglected farm in West Medford, that had been nearly stripped of foliage by the caterpillars of the gypsy moth. The hedge is in the care of a man who opposed an appropriation. A caterpillar that will eat the foliage of evergreens is certainly a rarity and a dangerous pest. For evergreens have slight powers of recuperation and die when the foliage is destroyed. Nothing but pure neglect would have permitted the destruction of a hedge that could easily have been saved by the use of insecticides.

"The secretary's survey showed that there will be a fair crop of caterpillars next year, unless the people in the localities infested do something to destroy the egg masses. As yet no enemy strong enough to kill the insect has made its appearance."—*Exchange.*

Forest Reserves as Game Preserves.

"In the annual report of the Zoölogical Society of Philadelphia for the year ending February 28, 1900, attention is called to the increasing difficulty of procuring specimens of the more important animals belonging to Pennsylvania, and says: 'It would appear probable that among the large tracts of land which are being acquired by the State of Pennsylvania as a "forest reserve," there should be some which will offer opportunity whereby some of our native animals which are still resident, but in decreasing numbers, such as the common deer, the wild turkey, and the ruffed grouse, may be indefinitely preserved, and perhaps others, such as the elk, reëstablished.

"'This noble animal was formerly abundant in mountainous regions, and it is not fifty years since the killing of the last one known within the State. It is certain that with suitable forest tracts of sufficient extent, and with adequate protection, this species could, at small cost, be again established as a resident.'

"We understand that it is the intention of the Forestry Commissioner to enforce the game and fish laws on the forest reserve, and possibly some portion could also be set aside as a game preserve."

—*Forest Leaves.*

Building Better than They Knew.

"Those working to secure a national park at the headwaters of the Mississippi River are certainly "building better than they knew." Every disinterested person will concede that the establishment by the Government of such a park within the borders of our State would attract many thousands of visitors annually. The publicity already given this Leech Lake region throughout the Union by the advocates of this park has already given the hotels at Walker and Cass Lake an overflowing patronage. The arguments to be put forth for the saving of the Pine forests on the Chippewa reservation and the bequeathing of same to the people for all time to come are legion. * * * The opening up of this reservation to settlement means simply a repetition of the Red Lake reservation timber sale, where the Government only realized on behalf of the Indians from the lumbermen $198,000 for timber cut and removed and actually worth $1,500,000—a deficit of nearly $1,300,000 unlawfully gained and which should be refunded to the Indians. Opposition to the establishment of the national Minnesota park is today coming wholly from this source. It

is with the people at large and the Mississippi Valley particularly to say whether private interest shall prevail against the public good."—Mr. Charles Christadoro in the *St. Paul Pioneer Press.*

Michigan and her Forests.

Mr. Charles W. Garfield, the President of the Michigan Forestry Commission, delivered an address before the Federation of Women's Clubs at Grand Rapids not long ago, of which the opening paragraphs follow:

"During the last winter, there has been in our State, the greatest amount of thieving of timber ever known, which probably has been due to the fact that there has been an appreciation of the value of lumber, and that the temptation has been too strong to be resisted. In some portions of Michigan the trespassers have been great lumber corporations, and their cuttings have been of timber that is very young, not by any means mature, and the slaughter has been without precedent in the annals of the State.

"For a good many years, we have had annually a terrible visitation of forest fires that has devastated immense quantities of timber lands, rendering valueless quantities of the best timber, destroying every vestige of life that would perpetuate the forest, and even destroying the very vitality of the soil. These fires have very largely originated with careless hunters or wilful carelessness on the part of men and boys who desired to make a commotion. The annual loss from fire can scarcely be computed.

"From reliable data I learn that many of these forest fires originate with people who use the north plains for pasturage purposes. Not being content to steal pasturage, they devastate the country by firing it over, under the theory that the grazing will be better the following season. The increased value of timber has led to increased valuation of lands, and as a result, many tracts have been sold, the owners feeling that they were driven to it by excessive taxation, and tempted to it by the greatly increased value of the product.

"In our own vicinity here at Grand Rapids we have examples of this. The owners have given no thought to leaving behind them a valuable heritage in the new growth of timber that will naturally spring up when the mature trees are taken away, but have entered into contracts which have resulted in stripping lands of every last bit of forest value. The most flagrant case of this kind that has come to my attention is what is known as Slocum's Tract, lying east of Muskegon and northeast of Ravenna, in Muskegon County. This is an area of above 4,000 acres, covered with the most valuable timber that grows in the State of Michigan, aside from White Pine. There is a large value in the mature, but a far greater prospective value in the growing timber that will not mature for a generation. The soil is excellent and the young timber is growing very rapidly. A reasonable and economic method of lumbering would so deal with this tract as to make it continuously valuable. But it has been sold, to be cleared and left perfectly bare in six years. This is an irreparable loss to the entire country contiguous to it."

Comment of a Lumber Review.

"Commercial forestry as a science and as an economic problem has been advanced in leaps and bounds and with a greater degree of consistency during the past half decade than during the earlier nine and one-half decades of the century, and it is a problem in which every lumberman is—or should be—deeply interested. * * *

"The point which lumbermen should grasp and retain is the demonstrable fact that by treating the tree as a crop—planting under proper conditions and harvesting when ripe and mature—a permanent and adequate return from the investment may be secured and the integrity of the forest preserved to be handed down to future generations."—The *Lumberman's Review* (N. Y.), August.

Growing Timber for Special Purposes.

"The constant demand for timber for purposes which do not require trees grown to full maturity suggested sometime

ago that experiments might profitably be made in supplying such wants by means of tree planting, an expedient that if shown to be practicable, would relieve our forests of some important demands. A few railroads have already made some efforts to grow timber for ties, though with but indifferent success, but beyond this nothing noteworthy has been attempted, altogether nothing practical accomplished. One railroad now has some experiments of the kind in progress, and with the more skillful handling they are likely to receive, it would not be surprising if something should come of them. The failure of two or three companies to raise Catalpa ties does not prove anything, as it is quite likely the experiments were not conducted in a way and under conditions to produce conclusive results.

"The results of tree cultivation under favorable conditions, which were embodied in a recent article in these columns, goes to show that wood available for such purposes as railroad ties, fence posts and pulpwood, and no doubt for many other purposes requiring only comparatively small sizes of timber, can be produced within a time that will make them readily available for helping out the present supply. The case referred to seemed to show that railroad ties could be grown from the seed under favorable conditions in from sixteen to twenty years, during which time the land used would yield enough to pay a good share of the cost in cuttings required to keep the plantation in proper shape. If anything like the yield secured in the particular case mentioned could be counted upon railroad ties could be produced by cultivation as cheaply as they can now be made from trees already grown. The tie requirement is so large and so little real progress appears to be making in replacing the wooden tie with one of metal, that the question of a supply of such timber as they require is likely to become a very important one in the near future.

"It is equally necessary that some source should be found for a supply of wood pulp material, which now calls for the clearing of about as much good forest land as the lumber business. Where can it be found, if not in the cultivation of woods for this special purpose? The wood-pulp industry is bound to grow, and it is most undesirable that anything should be done to restrict it; but if no provision is made for a supply of raw material, it will use up, and is now using up, a large proportion of our lumber supply. But as the pulp mills need wood fiber rather than lumber, there ought to be a good chance for them to get it without grinding up saw logs. Proper experiments would doubtless show that there is some variety of wood, susceptible of easy cultivation, and of rapid growth, that in a few years would yield such a quantity of pulp wood as should make its cultivation for this particular purpose a practical and profitable operation. There seems to be no reason why this should not furnish a solution of the pulp supply problem, whenever that question gets to a point where a solution of it must be found.

"One can readily see that the beginning of tree cultivation must be with those woods that are easily grown, and that will supply wants that may be met with such varieties. The cultivation of those of slower growth, but of larger use and wider value will follow. The largest consumers take the less valuable kinds, as a rule, and some of these could use sorts inferior in many respects to those they commonly employ, if such were to be had at lower cost. Take the box-makers for example. They use the poorest lumber they can find now, yet their requirements are mainly met with lumber that comes from large trees—in many cases, in fact, with lumber that might be used for purposes for which such narrow, low grade stuff as will do for boxes would not answer. The box people do not need wide lumber, nor long lumber; they can get along with almost anything that will hold together, and could as well use the product of a plantation which could not supply anything above six inches wide as the lumber from a forest of giants. Other purposes will suggest themselves, for which narrow stock, of comparatibely few years' growth would answer as well as lumber wide enough for

any work."—*St. Louis Lumberman*, August.

Towns Without a Tree.

"How many readers of *Forest Leaves* can picture the following situation, or believe that the statement is true: 'There are towns in our State *to-day* without a tree, or shrub, or even a bit of lawn. Our children are missing that element of refinement which comes from beautiful surroundings outside the home. Girls and boys are nearing maturity in some localities in the State to which any tree would be of interest, and to whom a glimpse of a fruit tree in blossom would be a glimpse into Paradise.'

"It apparently is true, nevertheless, and appears in a late bulletin of the Wyoming Agricultural Experiment Station.

"Wyoming is not an arid region, as the above implies, but contains an increasing population and three national forest reserves! Two points are emphasized by the quotation: first, that settlers, the older ones at any rate, rarely considered the importance of trees as shelter to their houses, their stock and their crops, and the source of lumber and fuel; second, that the forestry movement is spreading widely, and dwellers in such regions realize that a better state of affairs is possible for them.

"What we call the forestry problem has many phases, one or more applicable to every locality, but all closely related. If we, in Pennsylvania, need to preserve and reëstablish the forests on our hill-sides to save the streams, to prevent the washing away of valuable soil, and to afford healthful retreats for a large population, to say nothing of making permanent the great lumbering industry, our working for these things encourages our neighbors to look after their needs, to see possibilities that had not occurred to them before.

"And so by mutual help and inspiration the good work goes on, and brings nearer the day wherein the whole country will see the true value of trees and forests."—A. G. in *Forest Leaves* for August.

REVIEW OF AMERICAN AND FOREIGN PERIODICAL LITERATURE.

Among the articles worthy of mention in recent foreign forestry periodical literature the series entitled *Naturwissenschaftliche und forstliche Studien im Nordwestlichen Russland*, by Prof. Dr. Heinrich Mayr, of the University of Munich, deserves first place. They appeared in Nos. III., IV. and V. (1900) of the *Allgemeine Forst und Jagdzeitung* but have since been reprinted together in pamphlet form. This pamphlet is so full of interesting suggestions that a fair review of it would almost equal a literal translation. Its distinguished author was formerly a professor in the University of Tokio, Japan. He visited this country some years ago, and has written a book entitled "The Forests of America." He is a man who fearlessly tears down old theories, propagates new ones, and does an excellent work for Germany, especially Bavaria, in importing and experimenting with exotics from all parts of the world.

Russia, says Dr. Mayr, of all countries in Europe, is least visited, because of its immense distances and scant railroad facilities. Russians cannot conceive of traveling for pleasure nor of finding anything of interest to foresters in the vast monotonous plain between the White, Baltic, Black and Caspian Seas.

Prof. Mayr was especially interested in the seed supply question. It has long been the custom to buy Spruce seed in northern climates in order to secure hardy plants. This is wrong, says Prof. Mayr, for two reasons: first, we are ignorant of the condition of the young plants in northern climates, and second we are ignorant of the conditions and habitat of our own Spruce stands in Alpine regions. In such regions the young plants are protected by heavy snow. Their seed yield trees which require similar protection in youth. Such plants are really not frost-hardy. If frost-hardiness is an inherited trait, other traits must also be inheritable. Among these undesirable traits, slow-development and slow-increase, also stunted form, must be transmissible. The inheritance of such tendencies would outweigh the advantages of frost-hardiness.

The Spruce sheds its seeds during several weeks and thus produces plants which are both

frost-hardy and frost-tender in the same climate according as the frost is early or late. Nature's method of protection is not the cultivation of frost-hardiness but the provision of conditions under which sensitive plants can thrive, for instance by covering bare places with pioneer frost-hardy species such as Birch and Poplar. The best seed to use is that collected in your own neighborhood. Do not, says Prof. Mayr, expect any advantages from the usually much more expensive seed of northern regions, and do not fear the results from the use of the cheaper seed from warmer places.

Prof. Mayr is loud in his praises of the famous Pines of Riga with their straight boles and excellent wood. These plantations have been well established for years, giving rise to the variety "*rigensis*" of *Pinus sylvestris*. However, the author says, it is only shipped from Riga and that the wood really grows in the Southeast, where the Scotch Pine reaches its optimum. For years Riga Pine seed has been used in Germany with the hope of securing similar qualities. Dr. Mayr has long maintained that such qualities are not transmissible.

Prof. Mayr took a long zigzag trip with Max v. Severs, President of the Baltic Forestry Society, to investigate this Pine. He found wonderful stands of Scotch Pine superior to any in Germany. This superiority, he says, is due to the virgin soil—to the rich deposit of humus. Another cause is the atmospheric dampness. Dampness favors natural regeneration, which is impossible in southwestern Germany. This is easier in east Prussia, and so plentiful in Livonia and Finnland that the tree is considered aggressive toward other species. Natural regeneration tends toward the formation of fine straight boles in that disease and accident are less frequent. He reaches the same conclusion in reference to Scotch Pine seed that he did of Spruce.

Professor Mayr next considers the Larch. Today, he says, we know the qualities of this tree against which our forefathers sinned—they are its demands as to rich soil, its non-shade-enduring quality, and its need of side room for crown and branches. All over Europe there are Larch plantations that are little more than tree hospitals in which insects and fungi propogate. No one now thinks of planting the European Larch. The Siberian Larch takes its place—the true Siberian Larch (*Larix Siberica*). Dr. Mayr considers that this is a distinct species and not a mere variety. A very remarkable stand of this Larch exists between the Gulf of Finnland and Lake Ladoga. It is in a damp peninsula only a few feet above sea level. It ranks with the Maritime Pine of southwestern France and with the Silver Fir of Prinz Inn u. Knyphausen of East Friesland as one of the oldest and most noteworthy forest stretches of Europe. In the growing of the Siberian Larch, he says, don't plant it in sunny warm nurseries. Here it will freeze because it will bud too soon!

Dr. Mayr then considers the treatment of moorland, and then forest protection. In Russia proper the condition is similar to that of North America—with large burnt areas and carelessness about fire. In the Baltic Provinces it is quite otherwise. The method of combatting fire is not by fire lanes, but by a system of overseers or guards called "buschwächter," and of fire signalling. These bushwatchers have forest-farms here and there which are connected by telephone. The telephone has reached startling development, and in the treatment of fire its use results in an enormous saving of time and paper—by paper being meant the flood of reports and questions. Fire-alarm boxes are placed along the highways.

As to forest utilization and export, Dr. Mayr claims that Russia with her many waterways, with a few new canals, can supply immense quantities of wood to the rest of Europe for some time to come.

There is one forestry school in Finnland at Evõ—fifty kilometers from the nearest railroad—where the students and instructors lead a lonely life. The plan to have two years of the course at the University of Helsingfors and two years of practice at Evõ, is however, being considered.

Russia herself has only one forestry institute (Lesnoj Institute) near St. Petersburg. It has 400 students. The government is planning another for Southern Russia. Dr. Mayr returned to Germany very favorably impressed and surprised, especially with the fact that the State alone owns, exclusive of the Caucasus, land more or less wooded which is more than twice the size of the German Empire!

In the latest "*Bulletin Trimestrial de la Société Forestière Français des Amis des Arbres*" there is contained an interesting note in reference to a new Poplar which has been recently discovered in southern Algeria. It is *Populus Euphratica* and was first found by G. A. Olivier in Persia. It is remarkable in that it has two sorts of leaves entirely different in form. It is being tested in the extreme south of Algeria as its ability to endure heat and its dense shade render it extremely useful. The results thus far are satisfactory. Why not try it on our western plains?

According to this interesting little journal truffle-culture should be encouraged wherever the truffle Oak will grow. One hectare of land produces annually 3,000 francs. These Oaks should be planted on otherwise useless ground, preferably limestone regions, 1,500 trees to the hectare.

A company has been organized in the Po Delta to manufacture willow tresses for hats. These are thin strips of the rods of *Salix alba*. These hats are as glossy as silk and were very fashionable in Paris in 1830.

A new book entitled "Le Paturage en Forêt," by Alphonse Mathey (172 p., 19 tables) is highly recommended by the Swiss *Journal of Forestry*.

Another interesting publication entitled "Statistical Reports of Growth and Development of Conifers at Schovenhorst, Putten," by Dr. J. H. Schober, has just appeared (published by Julius Springer, 1900, 48 p., 2 marks). Dr. Schober is the famous Hollander who, in order to show the possibilities of the barren heath or Geest-lands of Holland, established an enormous pinetum at Schovenhorst where conifers from almost every corner of the world may be seen.

Three members of the Forestry Congress at Paris spoke in favor of introducing a popular festival similar to Arbor Day of the United States to foster interest in forest preservation. It is interesting to note that they were M. Delonele, of Paris; M. Ruig y Nalls, of Madrid, and M. Samios, of Athens.

A resolution was presented and adopted that the International Forestry Congress, which met in Paris, should be reconvened every two years conjointly with the Agricultural Congress.

D. E. Hutchins, Conservator of Forests at Cape Town, sends an interesting communication to the forest officers in India through the *Indian Forester*. In this letter he says: "There must, I suppose, be between 300 and 400 white forest officials in the Indian Forest Department, all able to ride and most able to shoot well. Some would be very welcome here now. In France and Germany the forest officials are, I believe, mobilized separately. It is a distinct gain that they should be, both for their esprit de corps and their special qualities as scouts. To young Anglo-Indians, service in South Africa just now must offer many inducements. Patriotism is a very practical virtue amongst Englishmen to-day; there is the excitement of service; the certainty of doing some good at least once in one's lifetime." There is an interesting footnote by the editor, however, which says that none were allowed to go because all were needed at home.

American foresters should read the *Indian Forester* carefully. It has the advantage of being in the English language and containing a great deal of general information in addition to many hints in reference to tropical growths which may be of service to us some day in Porto Rico and the Philippines.

The *Indian Forester* for April contains a translation of a series of letters in the *Revue des Cultures Coloniales* on "New Processes for Extracting Rubber." By these methods, which are both mechanical and chemical, rubber may be extracted from the smallest fragments of wood, bark and twigs which contain it. It is easy to see how, in case these methods are successful, tapping may be abolished, and that the whole tree may be utilized. This may also lead to the growing of rubber trees as one would field crops, reaping them while young and extracting from the twigs every particle of rubber which they contain.

In the *Indian Forester* for June there is an article on the "Camphor Industry for India," copied from the *Madras Mail*. According to this article the Camphor-Tree of Sumatra and Borneo is not the Camphor-Tree of China, Japan and Formosa. The Sumatra tree belongs to the Dipteraceæ. It has been named *Dryobalonops aromatica*, and *Shorea camphorifera* by another. The Japanese tree is *Laurus camphora* of the order Lauraceæ. He seems to think that there would be little difficulty in growing it in India and other regions of the tropics. It is no doubt abundant in the Philippines. He states that in Formosa the tree is recklessly cut down by the natives for the camphor and for boat timber. "Since the island came into the possession of the Japanese, the industry, instead of undergoing improvement, has only been further threatened by its conversion into a state monopoly so indifferently protected that any amount of illicit felling and manufacture goes on unchecked." Although, it is said, large quantities still exist, the industry has paid well in Japan, Formosa, Sumatra and Borneo.

The government of India on the recommendation of Mr. Ribbentrop, Inspector-General of Forests, has sanctioned the establishment of a plantation of Brazilian rubber trees in British Burmah. The plantation will cover 10,000 acres.

To the *Indian Forester* for June there is an appendix of fifty pages on the Sandal-tree by P. M. Lushington. The sweet-scented Sandalwood seems to be a very fastidious sort of tree. It won't stand transplanting, and, although it requires nurse-trees, it prefers to grow in the scrub in hedges and bushes rather than in the forest. It has peculiar tubercles on its roots, and many believe that it is more or less parasitic on the roots of other trees. The value of the wood is apparently rated by its scent.

In the *Allgemeine Forst- und Jagd-zeitung* appears an interesting note on the name of the White Pine. In Germany, in fact throughout the whole of Europe, the White Pine is called the "Weymouth's Kiefer," or Weymouth's Pine. This is due to the fact that Lord Weymouth introduced it into England. The peasants in certain sections, especially the woodchoppers, have twisted the word "Weymouth" into "Weidmann," which means "huntsman." In the course of time this tree may be known among the common people as the "Huntsman's Pine." In other sections it is called "Seidenföhre" or "Sideföhre," which means Silk-tree, because of the striking silky brilliancy of its leaves.

In the next issue of THE FORESTER I shall give a list of all the important foreign forestry periodicals and endeavor in the future to review systematically any articles which may be of interest to the readers of THE FORESTER. Since every good forestry journal should be a mirror of what is happening in the line of forestry in the country which it represents, there is no bet-

ter and easier way of keeping even with the movement throughout the world than by reading the current literature on the subject. Although much that is contained in these foreign journals is not applicable to this country it is all more or less instructive material which every well-informed forester should know even if he does not believe or use it. J. G.

RECENT PUBLICATIONS.

Fifth Annual Report of the Chief Fire Warden of Minnesota for the year 1899. C. C. Andrews. Pp. 143. Illustrations 36. Maps 2.

This report falls easily into two parts. In the first the operation of the State fire law is dealt with. This law has limitations, and the existing popular indifference about fires is a great drag on it. But it has none the less produced excellent results. To a certain degree the public has been taught to exercise more care about fires, many have doubtless been prevented, and where burning has begun it has been checked more promptly than of old. The second part of the report is devoted to driving home in several ways the truth that to keep otherwise useless land under forest is the soundest of sound sense. A description of the practice of forestry in different parts of Europe occupies 82 pages. A brief report on the "Problem of Forestry in Minnesota," by Dr. C. A. Schenck, is compact and to the point. The pages which General Andrews devotes to advocating the establishment of the Minnesota Park will be interesting to all who are in sympathy with that project. The illustrations in the volume deserve much praise. They are unusually interesting and instructive.

One does not open one of these annual reports in the expectation of finding anything new or unexpected; but Minnesota is one of the most interesting States in the Union for the forester, and every record of progress toward a proper care of its forests, and every fresh account of its conditions and needs, is to be welcomed not only because it is interesting, but because of the good it will do in educating the public. To this General Andrews' present volume makes no exception. The only part of it that is disappointing is the end. The casual reader who has been shown the evil state of things naturally asks, What is to be done? Can I help? But the conclusion tells him nothing more definite than that a "thorough-going forestry system" is needed. Unless he knows what the questions at issue are, or has read the recommendations which are sprinkled through the body of the report, this will leave no very clear-cut idea in his mind. Considering that the aim of so many reports on forestry is still to build up the right sort of public opinion, and that they reach the general public not directly, but through such unsatisfactory channels as press reviews and quotations, their recommendations should be massed in such a way that even the most careless reader could not fail to take them in.

Report on the Big Trees of California. Prepared under the Division of Forestry of the Department of Agriculture. Government Printing Office.

This report, which was presented in the Senate, on May 23d, by Mr. Perkins, was occasioned by the demand for information about the Big Trees incident to the proposal to made a national park of the Calaveras Grove. It is a compilation of all pertinent information about the Big Trees—their number, situation, botanical characteristics, history, ownership, etc. The report contains 30 pages, 19 illustrations, and two large maps. It is compiled with great care and its contents are thoroughly and clearly arranged and indexed.

Although there is no attempt to plead for the preservation of the Calaveras or any other grove, the statement of the facts, especially about lumbering among the Big-trees and the wantonness with which certain of them have been killed and cut down, point clearly enough of themselves to the desirability of a reservation.

Practical Tree Planting in Operation. By Geo. W. Tincher in the *Kansas Farmer* (Topeka), August 20th.

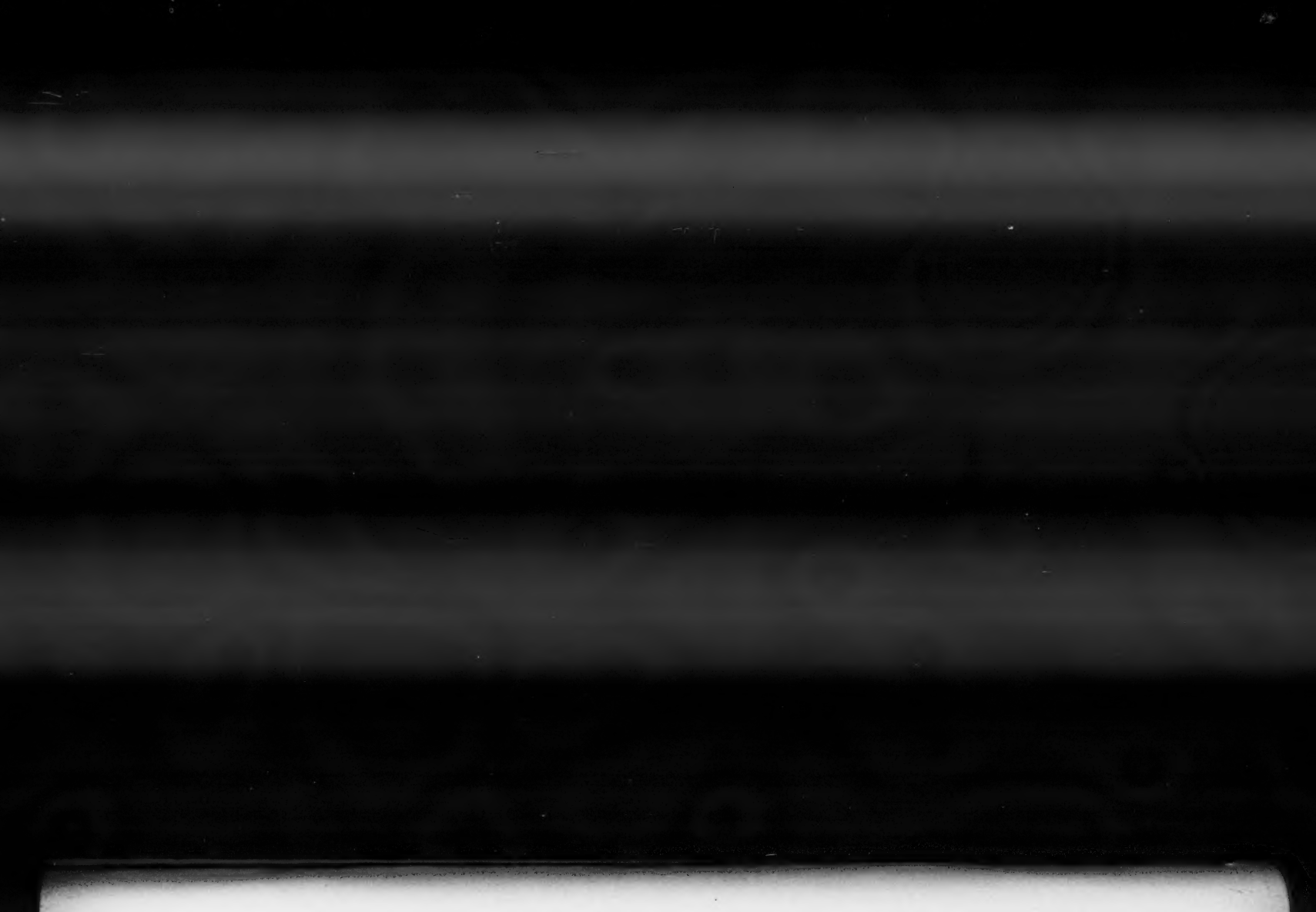
This is primarily a review of Professor J. W. Toumey's Bulletin (No. 27 of the Division of Forestry) which appeared under the same title. Mr. Tincher thinks that to plant trees 4 x 4 feet apart and in mixed plantations, as recommended by Professor Toumey, is undesirable, and goes on to give detailed criticisms of some of Professor Toumey's planting plans with suggestions for alterations.

Some Desirable Forestry Experiments. By Professor S. B Green, *Minnesota Horticulturalist*, September.

Under this title Professor Green writes a short paper advocating the introduction of the Douglas Fir, the Red Spruce of Maine, and the Norway Spruce into cultivation in Minnesota. It seems to him important "that a few varieties of trees be planted here on a considerable scale to determine their value for economic purposes, for which they seem especially promising."

Report on Forestry in Sweden. By General C. C. Andrews, U. S. Minister at Stockholm, 1869–77. Revised Edition. Government Printing Office. Pp. 35, illustrations, 2.

A revised edition of the report published in 1872, containing also a brief sketch of the present situation of Swedish forestry, to prepare which General Andrews engaged Mr. K. G. G. Norrling (extra jägmästare).



THE APPALACHIAN PARK.

The Proposed Appalachian National Park (with a two-page map and illustrations). By J. A. HOLMES, State Geologist of North Carolina. Vol. VI., No 7.

CUBA.

The Forest Conditions of Cuba and **The Silvicultural Prospects of Cuba** (with illustrations). By DR. JOHN GIFFORD of the Cornell Forest School. Vol. VI., Nos. 5 and 8.

THE TREE PLANTING REGION.

The Forests of Indiana, the Reliance of Her Manufactures. By JOHN P. BROWN, Secretary of the Indiana Forestry Association. Vol. VI., No. 5.

Tree Planting in Oklahoma. (Present methods and suggestions for improvements) and **Notes on Oklahoma.** By W. L. HALL, Ass't Sup't of Tree Planting, Division of Forestry. Vol. VI., Nos. 6 and 7.

Forests and the Paper Industry. By C. W. LYMAN, Sec'y of the International Paper Co. Vol. VI., No. 6.

The Big Trees of California. By WM. R. DUDLEY, Professor o Botany in Stanford University. Vol. VI., No. 9.

Forest Law in the United States. (The first two articles of a series). By TREADWELL CLEVELAND, JR., Historian of the Division of Forestry. Vol. VI., Nos. 7, 8, and 9.

What Forestry Means to the United States. By the HON. JAMES WILSON, Sec'y of Agricuture. Vol. V., No. 12.

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